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Abstract	This deliverable presents an evaluation of the experiments from the first (general and SME) Open Call regarding technical feedback, support and funding aspects.
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	P	Prototype	
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	O	Other	
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Contents

1	Introduction.....	5
2	Experiments covered in the analysis.....	6
3	General conclusions from the experiment reports.....	7
4	Detailed experimenter comments:	8
4.1	Successful experimentation results.....	8
4.2	At least one tool supporting all testbeds	8
4.3	Importance of experiment control.....	9
4.4	Transparent and easy access to testbed nodes is needed.....	9
4.5	Connectivity between testbeds is needed and should be simplified.....	10
4.6	Tutorials and centralized documentation and experimenter forum needed	10
4.7	jFed tool.....	11
5	Evaluation of experiment support	13
5.1	Survey on experimenter support	13
6	Preliminary analysis of sustainability aspects	16
6.1	Survey on sustainability.....	16
7	Conclusions.....	19
Annex A	Surveys on experiment support	20
	GEO-Cloud	20
	ChaosFire	24
	SSC.....	27
	MEVDDS	32
	MEDiANET	35
	IPCS4Fire.....	36
	SCS4Fire.....	38
	HEMOSF.....	41
	MEMO	43
	Mobile Train	45
	RimeCode	49

1 Introduction

This deliverable presents an evaluation of the experiments from the 1st Open call and the first SME call in the Fed4FIRE project. The feedback presented in this document is based on 2 types of information collected:

- Information from the experimenters through their reports, where specific comments are being distilled and analyzed (detailed reports in D10.1 and D10.5).
- Information collected from the testbeds on which the experiments were carried out. To collect this feedback in a structured way, the testbeds were asked to provide the information in a survey which is also presented in this document (detailed reports in Annex A).

The latter part is essentially an evaluation of the work and interaction carried out by the testbeds to run and support the experiments.

The deliverable is structured as follows: section 2 provides an overview of the experiments from the first general and SME Open Calls. Section 3 provides a general overview of the conclusions from the experiment reports, while section 4 goes into more detail on the comments from the individual experimenters. In section 5, an evaluation of the feedback from the patrons and involved testbed providers on the spent effort is given. Preliminary feedback on sustainability issues (especially related to funding) is discussed in section 6. Section 7 concludes this report.

2 Experiments covered in the analysis

This deliverable presents an evaluation of the experiments from the 1st Open Call of the Fed4FIRE project:

- GEO-Cloud
 - Partner: Elecnor Deimos
 - Used testbeds: BonFIRE, PlanetLab Europe, Virtual Wall
- ChaosFire
 - Partner: MTA SZTAKI
 - Used testbeds: Smart Santander, BonFIRE, Virtual Wall
- SSC
 - Partner: National University of Ireland Galway
 - Used testbeds: Smart Santander, PlanetLab, BonFIRE, Virtual Wall
- MEVDDS
 - Partner: Lancaster University
 - Used testbeds: OFELIA (Bristol and i2CAT islands), Virtual Wall
- MEDiANET
 - Partner: WOOX Innovations
 - Used testbeds: Virtual Wall, w-iLab.t
- IPCS4Fire
 - Partner: University of Kent
 - Used testbeds: Virtual Wall, BonFIRE
- SCS4Fire
 - Partner: University of Kent
 - Used testbeds: Virtual Wall, BonFIRE
- HEMOSF
 - Partner: Televes
 - Used testbeds: Virtual Wall, BonFIRE

In addition, the SME experiments¹ of the first call are also included (for more details on the individual reports, see D10.5 and appendices):

- MEMO
 - Partner: Routek S.L.
 - Used testbeds: w - iLab.t and C - Lab
- Mobile Train
 - Partner: Naudit High Performance Computing and Networking, S.L.
 - Used testbeds: FuSeCo and PerformLTE
- RIMECODE
 - Partner: VCI S.A Innovative IT Solutions
 - Used testbeds: PlanetLab Europe, w - iLab.t, NITOS, and Netmode

¹ Note that 3DI is not included because the experiment was not finished (see also D10.5)

3 General conclusions from the experiment reports

Considering the feedback collected from the Open Call 1 and first SME call experiments in Fed4FIRE, we can learn the following:

- All experimenters seem to be satisfied with the results they obtained with their experiment. Satisfaction can originate from different characteristics and values of the federation, such as the ability to repeat experiments and reproduce results, the qualitative and quantitative improvement over simulations, the centralized access to multiple testbeds to obtain comparable holistic results, etc.
- The experimenters validate the existence of federation tools with various functionalities, supported across multiple testbeds, to help them throughout their experiment lifecycle. More specifically, most experimenters clearly stress the fact that it is very convenient to have at least one single tool available in the federation which supports most functionality on all testbeds in order to efficiently set-up the experiments (e.g. the experiments used jFed).
- A number of experiments stress the usefulness of experiment control tools (e.g. OMF, NEPI and jFed timeline) to interact with their experiments.
- Transparent and easy access to the nodes of the testbed is needed to avoid the hassle of authentication and resource configuration throughout the experiment lifecycle.
- Connectivity between testbeds is needed and should be simpler.
- There is a large desire for tutorials on testbeds, interconnection of testbeds and experimenter tools, to speed up orientation and lighten the learning curve.
- A single and centralized experimenter forum is useful as experimenters do not have to worry about choosing the right contact address, and can find and share relevant support topics quickly.
- The jFed tool has received positive comments in all experiment reports and a number of suggestions that were made have been implemented afterwards.

4 Detailed experimenter comments:

In this part we elaborate on the general conclusions and include some statements (non exhaustive) for specific projects.

4.1 Successful experimentation results

From the point of view of the experimenters, the most important goal of the conducted experiments was to have successful results. In general, the experimenters were satisfied with the results they obtained from their experiments, as their confidence in the outcomes was higher because of the ability to repeat experiments and reproduce results, the qualitative and quantitative improvement over simulations, the centralized access to multiple testbeds to obtain comparable holistic results, etc.

Individual statements:

- HEMOSF: “The results have exceeded our expectations, because we knew that there were small problems in our protocol, but after the execution of HEMOSF experiment, we have found important improvements to do.”
- Mobile-train: “NAUDIT was able to conduct a broad range of crucial tests in various access network scenarios (2G, 3G, 4G/LTE) allowing us to harden our active network monitoring product and to speed up its market entry.”
- SCSFIRE: “We were able to road test our solution in a real world and heterogeneous multi - cloud environment, instead of relying on simulators and single cloud deployments.”
- Medianet: “we were able to test maturity of PGM to be exploited in connected entertainment applications.”

4.2 At least one tool supporting all testbeds

It is very important for a federation of testbeds to have at least one tool which is maintained by the federation and which supports all testbeds for as much functionality as possible, but mainly in terms of experiment set-up (accessing the testbeds, browsing the resources, reserving the resources, using the resources). At the time the Open Call 1 experiments started (Jan-Feb 2014), jFed did not yet support all testbeds. Experimenters using multiple testbeds mentioned this as an important requirement (e.g. more complete and horizontal support). This wider rollout of jFed was improved in the meantime.

The multi-testbed availability of these tools was a core interest of experimenters when using the federation. Even if specific tool functionality differed among the testbeds, their horizontal support, availability and familiarization was widely praised by the experimenters.

In some cases, suggestions were made to make specific testbed functionality available through the federation tools as well (e.g. “There is no ‘Boot Scripts’ option in jFed for BonFIRE” (SCS4FIRE)).

Individual statements:

- Medianet: “We must say that from the point of view of selecting platforms to work with, the overall jFed environment has provided a surprisingly nice and easy-to-use environment for setting up distributed nodes and overall connectivity. It was indeed very easy and straightforward in use and had a nice online ticketing utility for capturing use comments/problems and providing response.”
- SCS4FIRE: “The most valuable component to pay for is the federation API and its corresponding jFed tool that can be used to manage the resources of the heterogeneous Fed4FIRE testbeds.”
- Rimecode: “The integration of other testbeds in the jFed tool (e.g. Netmode) will facilitate experimentation involving testbed federation.”

4.3 Importance of experiment control

In order to conduct an experiment, it is not only important to easily select, set-up and connect the resources from different testbeds, but also their advanced control and management. Different tools offered by Fed4FIRE were widely used (NEPI, OMF and JFed timeline). Further developments of these management tools were also suggested (e.g. opening up the interfaces, deploy to more testbeds, etc.).

Individual statements:

- GEO-CLOUD “NEPI: It is a very user friendly library. It allows the user to be abstracted from all the necessary communications to deploy complex applications in a short time. It would be very helpful to have it available to experiment with BonFIRE and Virtual Wall.; The jFed timeline allowed us to execute commands instantaneously on multiple nodes or to execute commands based on a timeline. It would be interesting to provide an API (Java, Python or Bash) or through command line interface.”
- Medianet: “JFed timeline allowed us to schedule logic downloading on the reserved nodes and perform measurements acquisition on them via scripts scheduled to run automatically. The tool was used for allocation on specific timeslots to our experiment.”
- HEMOSF: “The experience with OMF is good, because it allows the control of our experiment in a simple way. Therefore, OMF gives the possibility to control actions and when these actions will be executed. All actions are programmed to be executed.”
- RIMECODE: “NEPI was used for deploying appropriate applications on the PlanetLab nodes, while configuring the resources appropriately to set-up the experiment; OMF provided an easy way to instrument and execute the experiment in the wireless testbeds, while facilitating the control of the experiment resources.”

4.4 Transparent and easy access to testbed nodes is needed

Access to the testbeds is also very important. Depending on the specific testbeds, different options are available (IPv4, IPv6, VPN). For example, the nodes of the iMinds Virtual Wall and w-iLab.t testbed are only reachable over public IPv6. By providing an IPv4 – IPv6 SSH proxy and integrating it with jFed, experimenters had no problems with logging in on the nodes. Another example is the

MEMO experiment that described difficulty accessing C-Lab/WIBED for which a VPN was needed, and difficulty accessing mobile nodes in w-iLab.t (which is not provided by default, to minimize wireless disturbance).

In the meantime the SSH proxy is now usable for all testbeds which do not have public IPv4 addresses for the nodes because they use IPv6 or a VPN.

Individual statements:

- MEVDDS: “After creating a new virtual machine, accessing them was simple. However, there seems to be some inconsistency between the different infrastructures in terms of the necessity for VPN access. It would likely be easier to have a consistent approach to this.”

4.5 Connectivity between testbeds is needed and should be simplified

At the time that Open Call 1 experiments started, there was not yet layer 2 connectivity between testbeds available, although some experiments needed this.

Some experiments used multiple testbeds in a sequential way or let data stream over the internet, but others specifically needed layer 2 connectivity (e.g. for OpenFlow experiments or for higher bandwidth requirements).

In the meantime, layer 2 stitching has been implemented in Fed4FIRE and is now available through jFed. Several of the experiments used this already when it later became available.

Individual statements:

- HEMOSF: “We consider that it is difficult to execute the HEMOSF experiment at commercial testbeds, because they do not have all capabilities of interconnections between heterogeneous testbeds.”
- GEO-CLOUD: “At the beginning jFed did not support configurable connectivity with BonFIRE. This changed and now is a nice feature. It would also be nice to have the possibility of configuring links between Virtual Wall and BonFIRE nodes. It is not possible to customize and to create natural links using jFed between Virtual Wall and the BonFIRE machines. When we implemented GEOCloud, the Bridge component was not available.”

4.6 Tutorials and centralized documentation and experimenter forum needed

Several experiments mentioned the need for tutorials to use specific testbeds or to combine multiple testbeds in a single experiment. Since those comments, tutorials have been developed and presented at several Fed4FIRE workshops (experimenters reacted very positively to them). There are also a number of tutorials online (see <http://doc.fed4fire.eu>) and further ones are planned. It is now also a requirement for a testbed in the Fed4FIRE federation to provide documentation and a tutorial (both existing Fed4FIRE testbeds and future entries to the federation). The same is true for tool providers.

Experimenters also commented on the value of centralizing such documentation, instead of having to search multiple sources (e.g. for each testbed). This echoes the primary value proposition of the federation: the benefits of a single access point to a multiple heterogeneous testbeds. Likewise, the

access to documentation should follow suit, allowing experimenters to compare approaches of tools across testbed offerings, for example.

There was also a central experimenter forum set-up (<http://groups.google.com/group/fed4fire-experimenters>). Positive feedback came from this, as experimenters can easily submit their questions without a complicated set of problem-specific contact points (e.g. for a particular tool, testbed, etc.). In the meantime, experimenters can search this forum to learn about previous questions, first-hand experience and lessons learned.

Individual statements:

- MEVDDS: “A better ‘getting started’ tutorial. We had to contact people directly to find examples of more complicated experiments (multi-site), and the available demos weren’t always detailed enough for what we wanted to achieve. In the end, we resorted to using material delivered in a tutorial session as the basis for our experimentation work.”
- HEMOSF: “On the other hand, we think a document is necessary with several examples of creation and execution of experiments that use different testbeds at the same time.”
- GEO-CLOUD: “Sometimes the information related to the testbeds and tools in the Fed4FIRE webpage (<http://www.fed4fire.eu/>), in the Fed4FIRE’s documentation webpage (<http://doc.fed4fire.eu/>), and in the testbeds’ manuals was not congruent. Mainly related to the tools for discovery, reservation and provisioning; experiment control; and measuring and monitoring. We had to do some suppositions and leave things to be defined and to be confirmed in the detailed design documents.”
- MEMO: “The scope and diversity of provided tools is so extensive that an overview highlighting the strength and weaknesses of each tool would be helpful. For example for us it was difficult to easily see to what extent existing tools (F4f portal, JFed, Flack, Omni, OMF6 EC, NEPI, OML and its variants, robot control, ...) provided certain demands (as indicated above for automation) and to which extent they could be used for certain testbeds. In a sense, less tools with and a higher testbed integration would also help here.”

4.7 jFed tool

Many experiments did use jFed for provisioning resources, a popular tool of the federation. A major feedback attributed to its success was for its extended support towards other testbeds, so experimenters could avoid having to learning additional tools or command line interfaces. In some cases it was indeed not possible to use the jFed tool (e.g. because some testbeds were not integrated in jFed at the time of the experiment). Also the usage of scripts to control experiments was asked for and implemented in jFed through the appropriate APIs afterwards. Other suggestions were to include more advanced reservation functionality, allowing to plan resource allocations in the future, a functionality which is put on the roadmap for jFed.

Individual statements:

- MEVDDS: “There was a steep learning curve with the toolset, especially since we had to employ the use of two separate tools, as jFed support was not complete during our experimental phase. If we didn’t have to familiarize ourselves with multiple tools, setup would have undoubtedly been accelerated. The installation and running of jFed was simple, allowing us to get up and running with a single click. Omni wasn’t complicated,

but it does not offer the same '1-click' experience. Again, it would have been better to forego Omni entirely and completely streamline the process using jFed.”

- MEVDDS: “Our biggest request would be to have jFed developed to the point where it can be the sole piece of software for all experimentation in the federation.”
- RIMECODE: “Furthermore, a reservation system combined with JFed in order to provide the capability of future reservations would be a very positive improvement for the design of the experiment.”
- CHAOSFIRE: “In case of BonFire the only problem we had is that it was difficult (or impossible) to know when the required resources will be available (or will be available at all).”
- CHAOSFIRE: “Although we enjoyed working with jFed, we prefer controlling our experiments from scripts. Therefore it would be nice if all services of Fed4Fire would be available via APIs and invocable from any environment.”

5 Evaluation of experiment support

This section provides an overview of the support offered by the testbed providers to the experimenters from the first Open Calls (both the SME Open Call and the general Open Call). Note that only for the SME Open Call, specific patrons were appointed to guide and support the SMEs throughout their experiments, where needed. For each experiment, 10K euro was reserved for the patron (or an equal share per patron in case there were multiple involved).

5.1 Survey on experimenter support

In order to gather input on the level of support provided to the experimenters, a questionnaire was distributed to collect feedback from the testbed providers and patrons.

Topic	#	Question
General effort	1	How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
	2	Is the total spent effort more or less than anticipated or is it in line with your expectations?
Technical work	3	How much effort (in number of person days) did you spent on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
	4	Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
	5	How much effort (in number of person days) did you spent on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.
Interaction	6	Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
Nature	7	Was the experiment a typical example you expected for your testbed and its capabilities?
Improvements	8	How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?

A summary of the feedback per experiment is given in the table below. The provided values are averaged over all testbed providers (or patrons) involved in the experiment. Average values are shown in yellow, while green and red colouring indicates less or more effort than expected.

		General effort		Technical work			Interaction	Nature	Improvements	# patrons
		1	2	3	4	5	6	7	8	
	MEMO	0,5	in line	2	adaptations to mobility framework; new tutorial	7	1cc; 70 e-mails	typical	improved forum and tutorials	2
	Mobile Train	1,1	bit more	18	PTP server; controlled access to application; HW upgrade	5	cc; e-mails	not completely, but will improve / typical	improved tutorials; possibly multiple SW versions	2
	RimeCode	2	more	33	enhanced tutorials	0	weekly cc; 70 e-mails; 1 visit	typical	improved tutorials; base images	1
General	GEO-Cloud	0,4	in line	3	documentation; L2 interconnection	2	2 cc; 40 e-mails; forum;	typical	access to PL US; base images, reservation, account creation;	3
	ChaosFire	0,4	in line	2	REST API functionality	0	1cc; 3d visit; 20 e-mails	typical approach, atypical data	improved REST API; experiment descriptions	1
	SSC	0,4	in line	2	REST API functionality	0	3 cc; 10 e-mails; forum	typical	improved REST API; tutorials	4
	MEVDDS	0,6	in line	8	L2 interconnection	3	1cc; 150 e-mails	typical	improved documentation; tutorials	3
	MEDIANET	0,7	in line	5	N/A	3	2 cc; forum; mails	typical	specific HW integration effort needed	1
	IPCS4Fire	0,1	less	2	base image	0	1cc; 10 e-mails	typical	base images; account creation	1
	SCS4Fire	0,1	less	1	base image	0	10 e-mails	typical	base images; account creation	1
	HEMOSF	0,1	less	0	N/A	0	e-mails; forum	typical	N/A	3

X < 0,3	less	X < 3 d	N/A	X < 2	X < 2 h	rather basic	N/A
0,3 < X < 0,7	in line	3 < X < 10	doc. & tutorial	2 < X < 4	2 < X < 10 h	typical	doc. & tutorial
0,7 < X	more	10 < X	add. function	4 < X	10 < X h	rather hard	add. function

in Person Months

in Person Days

in Person Days

in hours

1h = 1 cc = 10 e-mails =
10 forum posts

In general, the following conclusions can be drawn:

- On average, the general effort offered per testbed provider or patron is about 0.5 Person Month (PM), which is in line with expectations. In two cases, more effort than expected has been provided (1.0 to 1.5 PM in addition), mainly due to the fact that additional functionality had to be added to the testbed and/or help has been provided to design and setup the actual experiment.
- Typically, the effort per testbed provider can be evenly divided over technical work and bug fixing. The technical work includes help to use the infrastructure and tools, help in performing the actual experiment and adaptation of the standard testbed setup specifically for the experiment. Bug fixing is required to repair existing testbed functionality.
- Interaction with the experimenter usually involves a few dedicated conference calls, combined with several tens of e-mails or forum posts.
- After the feedback from the experimenters, upgrades of the documentation and tutorials are performed in most cases. In some cases, additional functionality is added to the testbeds or new base images for virtual machines are made available.
- Most experiment scenarios fit the purposes of the testbeds. In some cases where the testbed is not fully integrated or federated, a small mismatch with the current testbed functionality could occur.
- Further improvement of the documentation and tutorials, more automated account creation and availability of custom images on several testbeds will reduce the required effort in the future.

6 Preliminary analysis of sustainability aspects

Each of the final reports from the (general and SME) Open Call 1 experiments (D10.1 and D10.5) contains a section with questions related to funding. A preliminary analysis of the responses is given below, while a more detailed examination will be included in D2.12.

6.1 Survey on sustainability

The questions below, related to funding of the experiment, have been answered by all the experimenters.

#	Question
1	Was the allocated budget related to the experiment to be conducted high enough (to execute the experiment, in relation to the value perceived, etc.)?
2	Would you have executed the experiment without receiving any external funding?
3	Would you even consider to pay for running such an experiment? If so, what do you see as most valuable component(s) to pay for (resources, support, etc.)?

A summary of the feedback per experiment is given in the table below.

		Sufficient funding?	Without funding?	Pay in future?	
				In general	Valuable characteristics
	MEMO	Yes	Smaller scope only	No	Specific resources (e.g. w-iLab.t)
	Mobile Train	Yes	No	No	federated resources, support
	RimeCode	Yes	No	Possibly	
General	GEO-Cloud	Yes	Smaller scope only	Freemium	consultancy, additional training, experiment-to-product mentoring
	ChaosFire	Yes	Smaller scope only	No	
	SSC	Yes	Smaller scope only	Possibly	
	MEVDDS	Yes	Smaller scope only	No	support
	MEDIANET	Yes	No	Yes	availability, sufficient QoS
	IPCS4Fire	Yes	Yes	Yes	federated resources and APIs, jFed
	SCS4Fire	Yes	No	Yes	federated resources and APIs, jFed
	HEMOSF	Yes	No	Yes	holistic offering

Yes	Yes	Yes
	Smaller scope	Possibly
No	No	No

For “valuable characteristics”, it should be noted that experiments were asked to identify specific aspects *beyond* the primary value proposition of the federation (i.e. centralized access to a multitude of diverse testbeds), which was widely validated by experimenters as the main rationale to use the Fed4FIRE offerings.

In general, the following conclusions can be drawn:

- All Open Call 1 experiments confirmed that they indeed had sufficient funding to set-up and execute the project. Although absorbed in their total budget, some participants responded that they had initially underestimated the setup time of their experiment, and to a lesser extent, the administrative overhead of their FP7 involvement.
- When asked if they would have, in hindsight, carried out the same experiment and scope without such funding, all responded negatively. Some claimed that they could have significantly downsized the scope, but at an equally significant sacrifice to quantity and quality (and therefore core value) of results. Other experiments, in particular some academic organizations and SMEs, responded that they did not have the internal resources

to independently go forward with any such experiment without an external source of funding.

- When looking towards the future prospect of paying for Fed4FIRE experimentation and related services, the majority of experimenters (2/3) confirmed they would at least consider it, depending of course on the details of the business model and costs involved. They validated the core value proposition of the federation (e.g. single access point to a heterogeneous collection of testbeds), and furthermore highlighted features and qualities of the future offering that they deemed most valued, and most likely to pay for, including premium access & support, specific tools and consultancy services. A chief concern when contemplating a non-funded experiment at cost to their organization was the initial investment of setup time and steep learning curve; although they acknowledged that key Fed4FIRE support features were still being rolled out in parallel during the Open Call 1 phase, and significantly improved over time. The sustainability-related tasks of the projects are further analyzing this feedback, and will return to Open Call 1 experimenters for further feedback on the different sustainability models developed.

7 Conclusions

The feedback from the experiments has allowed the project to identify important issues, related to both technical and sustainability topics, as well as the most important experimentation values of the federation. Many of the technical aspects have been taken into account in the second cycle of implementations already, as well as in the publicly available documentation and tutorials, while the input on sustainability will help drive the future work in the corresponding work packages.

Experimenters especially valued the improved experimentation characteristics (repeatable experiments, reproducible results, qualitative and quantitative improvement over simulations, centralized access to multiple testbeds to obtain comparable holistic results), the uniform functionality supported by the federation tools over multiple testbeds, transparent resource access, testbed interconnectivity and a centralized location for documentation, tutorials and forum interaction.

Features such as additional improvement of the documentation and tutorials, more automated account creation and availability of custom images on several testbeds will further reduce the required effort for testbed and support providers in the future.

Annex A Surveys on experiment support

This section collects all the feedback from patrons and testbed providers involved in the different Open Call 1 experiments.

GEO-Cloud

Report from PLE

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
 - 0.5 PM (technical support, confcall meetings participation)
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
 - In line with expectations

Technical work

- (3) How much effort did you spend on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
 - 2 Days with technical support directly to help the experimenter. Most of the support was intended as information on the testbed (e.g. on explaining procedures, features and limitations of the testbed and tools)
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
 - No
- (5) How much effort did you spend on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.
 - 1 Day (The experiment needed globally distributed nodes that included PlanetLab Central nodes that were not directly available through Fed4Fire. Support was given to the experimenters to let them access the needed nodes).

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
 - Mainly via email (in particular through the mailing list fed4fire-experimenters@googlegroups.com) and confcalls via gotomeeting

Nature

- (7) Was the experiment a typical example you expected for your testbed and its capabilities?

- Yes, the distributed nature of PlanetLab helped the experiment setup and execution.

Improvements

(8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?

- Ease the access to the US portion of PlanetLab, even though the issue is not technical.

Report from BonFIRE

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
- 8 to 10 days
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
- Yes

Technical work

- (3) How much effort did you spend on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
- GEOCLOUD was the first OC1 experimenters to use BonFIRE through Fed4FIRE hence they tested the new documentation and features as they were coming, they were also wanting to test every features available
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
- Mostly bug fixing and documentation
- (5) How much effort did you spend on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.
- 5 days on fixing the load balancer image (this was delayed due to this feature having being developed by a former BonFIRE partner that was unavailable at the time)

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
- Mostly e-mails (or Fed4FIRE googlegroup, but as I consult them through e-mail I don't see any difference) – around 40, one third being reference to documentation (that helped structure it for Fed4FIRE users), the other part were more focus on experiment design and feature requests.

Nature

- (7) Was the experiment a typical example you expected for your testbed and its capabilities?
- Yes

Improvements

- (8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?
- Providing more different OS images as standard (ongoing)
 - Fixing g5k_reservation (ongoing)
 - Fixing load balancer image (done)
 - Getting the Fed4FIRE automated account creation working (minor)

Report from Virtual Wall

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
- 5 days
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
- Inline with expectation

Technical work

- (3) How much effort did you spend on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
- They needed interconnectivity between Bonfire and the Virtual wall and this was not yet there at the start of their experiment but was built during the experiment (on a more global task on connectivity, not only for this experiment)
 - 3 days helping and debugging interconnectivity
 - 2 days, helping them upscale the experiment.
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
- Yes, layer 2 interconnectivity is now foreseen between most testbeds where it is relevant.
- (5) How much effort did you spend on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
- All of it was through the fed4fire usergroup, 1 or 2 gotomeeting calls.

Nature

- (7) Was the experiment a typical example you expected for your testbed and its capabilities?
- Yes

Improvements

- (8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?
- Tutorials are now available which describe these steps.

ChaosFire

Report from SmartSantander

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
- 0.6PM (tutorial preparation took around 1 week but there were two different experiments proposals [2.5. days], general support/interaction [2 days], technical work on top on provided interface [2 days] and an on-site visit in Santander [2 persons during 3 days])
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
- It is in line with the expected effort. Prior to the experiments we needed to implement a generic way of accessing SmartSantander service data (this effort is not included in the 0.6PM) and some modifications based on real feedback were expected. On the other hand, the ease of use of the provided REST interface together with the provided documentation helped to reduce the questions from the experimenter.

Technical work

- (3) How much effort did you spent on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
- Some modifications were included in the REST API (v1) functionality during the experiment lifecycle based on the experimenter feedback. However, some of the problems reported (very high latency on historic information retrieval) implied a whole redesign of part of the SmartSantander Service Layer back-end infrastructure. The work carried out for those minor modifications can be estimated in 2 days.
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
- The adaptations were available for every experimenter using the provided REST interface (v1) to access SmartSantander service layer. However, this interface has been deprecated at the end of Fed4FIRE cycle 2.
- (5) How much effort did you spent on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.
- All technical work was done to improve functionality, not for bug fixing.

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
- We tried to make the documentation as clear as possible and introduced it during the kick-off phone conference. This helped us to reduce interactions. Therefore, a more detailed documentation was not needed for the 1st Open Call. Nevertheless, it should be mentioned

that based on the experience during 1st OC, we have decided to provide a more interactive documentation for 2nd Open Call experimenters.

- The interactions were:
 - 1 phone conference [2 hours]
 - 1 on site-visit to Santander [3 days] to perform part of the experiment
 - Around 15-20 received emails to ask some different questions regarding the testbed

Nature

(7) Was the experiment a typical example you expected for your testbed and its capabilities?

- The experiment was based on the simulation of an ad-hoc P2P network to exchange opportunistic information in a city when there were problems with the traditional networks. In this sense, it used SmartSantander real time sensor data as the information ChaosFire users were exchanging. The way the SmartSantander testbed is used is a typical approach, but the nature of the information extracted from SmartSantander is not relevant to the experiment.

Improvements

(8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?

- Most of the effort was done because provided interface was not mature enough at that time. Based on the Fed4FIRE 1st Open Call experiments feedback, some of the components in SmartSantander have been redesigned and a new REST API has been built from the scratch. Those new components will be used by the 2nd Open Call experiments, so support effort should be reduced.

Report from Virtual Wall

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
- 1 day
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
- Inline with expectation

Technical work

- (3) How much effort did you spend on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
- The 1 day was spent on helping in designing the experiment during phone conf.
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
- no
- (5) How much effort did you spend on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.
- none

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
- Gotomeeting calls

Nature

- (7) Was the experiment a typical example you expected for your testbed and its capabilities?
- Yes

Improvements

- (8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?
- It would be interesting to have a description of these kind of experiments how they did it, so other experimenters can learn from it. Sometimes things can not be disclosed of course.

SSC

Report from SmartSantander

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
- 0.4PM (tutorial preparation took around a week (5 days) but there were two different experiments proposals [2.5 days], general support/interaction [3 days], technical work on top on provided interface [3 days].
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
- It is in line with the expected effort. Prior to the experiments we needed to implement a generic way of accessing SmartSantander service data (this effort is not included in the 0.4PM) and some modifications based on real feedback were expected. On the other hand, the ease of use of the provided REST interface together with the provided documentation helped to reduce the questions from the experimenter.

Technical work

- (3) How much effort did you spent on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
- This experiment needed to retrieve as much information as possible. The provided REST API (v1) did not include the sensor measurements coming from part of the infrastructure (essentially participatory sensing and augmented reality). We spend some effort on trying to make those resources available through the REST API, which can be estimated in around 3 days. In addition, some of the problems detected implied a whole redesign of part of the SmartSantander Service Layer back-end infrastructure. It was decided that the effort to make all the SmartSantander resources available should be done on top of the new components.
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
- The adaptations were available for every experimenter using the provided REST interface (v1) to access SmartSantander service layer. However, this interface has been deprecated at the end of Fed4FIRE cycle 2.
- (5) How much effort did you spent on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.
- All technical work was done to improve functionality, not for bug fixing.

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
- We tried to make the documentation as clear as possible and introduced it during the kick-off phone conference. This helped us to reduce interactions. Therefore, a more detailed documentation was not needed for the 1st Open Call. Nevertheless, it should be mentioned

that based on the experience during 1st OC, we have decided to provide a more interactive documentation for 2nd Open Call experimenters.

- The interactions were:
 - 3 phone conferences [4 hours]
 - Around 5-10 received emails to ask some different questions regarding the testbed

Nature

(7) Was the experiment a typical example you expected for your testbed and its capabilities?

- This experiment has different objectives. The one related to SmartSantander testbed is a good example of retrieving smart city sensor information and provide citizens with a value added service on top of it. In this case, this value added service is transforming this raw information into RDF data for a later SPARQL query-based processing. Even though this does not seem useful to a citizen, but can be used by 3rd party service providers.

Improvements

(8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?

- Most of the effort was done because provided interface was not mature enough at that time. Based on the Fed4FIRE 1st Open Call experiments feedback, some of the components in SmartSantander have been redesigned and a new REST API has been built from the scratch. Those new components will be used by the 2nd Open Call experiments, so support effort should be reduced.

Report from PLE

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
- 0.5 PM (technical support, confcall meetings participation)
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
- In line with expectations

Technical work

- (3) How much effort did you spend on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
- 2 Days with technical support directly to help the experimenter. Most of the support was intended as information on the testbed (e.g. on explaining procedures, features and limitations of the testbed and tools)
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
- No
- (5) How much effort did you spend on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.
- No issues were encountered

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
- Mainly via email (in particular through the mailing list fed4fire-experimenters@googlegroups.com) and confcalls via gotomeeting

Nature

- (7) Was the experiment a typical example you expected for your testbed and its capabilities?
- Yes, the distributed nature of PlanetLab helped the experiment setup and execution.

Improvements

- (8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?
- Experimenters were already familiar with the testbed and available tools.

Report from BonFIRE

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
 - 0.3 PM (6 days general support/interaction)
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
 - In line with expectation.

Technical work

- (3) How much effort did you spend on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
 - 1 day. Technical assistance for providing specific VM images.
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
 - No.
- (5) How much effort did you spend on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.
 - None.

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
 - Interaction through phone calls (several short calls) and tele-conferences (2 x 2 hours slots). Also through e-mail and the Forum.

Nature

- (7) Was the experiment a typical example you expected for your testbed and its capabilities?
 - Yes.

Improvements

- (8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?
 - No.

Report from Virtual Wall

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
- 5 days
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
- Inline with expectation

Technical work

- (3) How much effort did you spend on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
- Follow up on design of their experiment.
 - Helping them in interconnecting with the internet
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
- (5) How much effort did you spend on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
- Most of it was through the fed4fire usergroup, some private mails, 1 or 2 gotomeeting calls.

Nature

- (7) Was the experiment a typical example you expected for your testbed and its capabilities?
- Yes

Improvements

- (8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?
- Tutorials are now available which describe these steps.

MEVDDS

Report from OFELIA

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
- 0.5 PM (7 days general support/interaction, 3 days technical work on bug fixing & software)
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
- In line with expectation.

Technical work

- (3) How much effort did you spend on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
- 7 days. Most of the effort consisted in supporting the user on configuring and performing the experiment.
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
- No specific adaptations were required to perform the experiment.
- (5) How much effort did you spend on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.
- 3 days. When a bug was found during the supporting on configuring or performing the experiment, the procedure stopped until the bug was solved.

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
- 1 phone conference with all the implicated partners
 - Approx. 150 e-mails, most of them handled privately between i2CAT and the Lancaster University.

Nature

- (7) Was the experiment a typical example you expected for your testbed and its capabilities?
- The experimenter used the typical available resources of the testbed, VMs to deploy software (such as the OpenFlow controller) or store data and OpenFlow-enabled switches

and their links to define a SDN network. The only innovative part was the interaction with other Fed4FIRE testbeds which interconnection was a requirement of the Fed4FIRE project.

Improvements

(8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?

- Although the experiment did not use any new feature apart from the other testbeds interconnection, due to it is always in constant development and the usage of resources was a little bit above the average, there were quite some bugs during the experiment. Together with the support provided explain the high amount of mails. The expected reduced number of bugs after more time of development united to an improved documentation that is being written should reduce the support effort in future experiments.

Report from Virtual Wall

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
- 15 days
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
- Inline with expectation for this kind of complex multi site openflow experiment

Technical work

- (3) How much effort did you spent on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
- Follow up on design of their experiment. Helping them on openflow and on interconnectivity between virtual wall and ofelia sites.
 - At the start of the experiment, the interconnectivity was not yet set up, so this was enabled during the experiment (although foreseen in the roadmap of fed4fire, so not specifically set up for this experiment).
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
- Yes, the layer 2 connectivity is now fully operational for all experimenters.
- (5) How much effort did you spent on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.
- Not much, more help in tracking why something not worked, and debugging the connectivity between the virtual wall and ofelia.

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
- Most of it was through the fed4fire usergroup, some private mails, 1 or 2 gotomeeting calls.

Nature

- (7) Was the experiment a typical example you expected for your testbed and its capabilities?
- Yes

Improvements

- (8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?
- Tutorials are now being developed on this.

MEDIA NET

Report from w-ilab.t

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
- 15 days
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
- Inline with expectation for an experiment bringing its own equipment in the lab.

Technical work

- (3) How much effort did you spend on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
- Follow up on design of their experiment.
 - Helping them accessing the testbed from behind the company firewall. Helping them putting their equipment in the lab.
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
- No new adaptations, the specific hardware owned by the experimenters was again removed afterwards.
- (5) How much effort did you spend on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.
- 3 days, debugging on specific wireless setups

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
- Most of it was through the fed4fire usergroup, some private mails, 1 or 2 gotomeeting calls, local integration in the lab

Nature

- (7) Was the experiment a typical example you expected for your testbed and its capabilities?
- Yes

Improvements

- (8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?
- Integration of specific hardware in the lab requires specific help.

IPCS4Fire

Report from BonFIRE

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
- Very little – 2 or 3 days total maybe?
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
- Less

Technical work

- (3) How much effort did you spend on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
- Reviewing experiment design ~ 1 day. No help was requested with interpretation. A custom image (different OS) was created (shared with the SCS4FIRE experiment) ~ 1 day
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
- The particular image will not be made generally available, but we are investigating ways to provide a wider range of OS images on BonFIRE
- (5) How much effort did you spend on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.
- None – no feedback was received until the end of the experiment

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
- 1 phone call of approximately 1 hour
 - e-mails relating to OS image issue
 - 2 e-mails relating to account and group creation
 - Outcome was satisfactory in all cases, no reference to documentation was required

Nature

- (7) Was the experiment a typical example you expected for your testbed and its capabilities?
- Mostly yes, although not a very demanding one as far as support was concerned

Improvements

- (8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?
- Providing more different OS images as standard
 - Getting the Fed4FIRE automated account creation working (minor)

Report from Virtual Wall

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
- Nothing special
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
- Inline with expectation

Technical work

- (3) How much effort did you spend on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
- Nothing special
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
- (5) How much effort did you spend on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
- through the fed4fire usergroup

Nature

- (7) Was the experiment a typical example you expected for your testbed and its capabilities?
- Yes

Improvements

- (8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?

SCS4Fire

Report from BonFIRE

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
 - Very little – 2 to 3 days at max
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
 - less

Technical work

- (3) How much effort did you spend on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
 - Reviewing experiment design ~ 1 day
 - A custom image (different OS) was created (shared with the IPCS4FIRE experiment) ~ 1 day
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
 - The particular image will not be made generally available, but we are investigating ways to provide a wider range of OS images on BonFIRE
- (5) How much effort did you spend on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.
 - None – no feedback was received until the end of the experiment

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
 - e-mails relating to OS image issue
 - 2 e-mails relating to account and group creation
 - Outcome was satisfactory in all cases
 - No reference to documentation was required

Nature

- (7) Was the experiment a typical example you expected for your testbed and its capabilities?
 - Mostly yes, although not a very demanding one as far as support was concerned

Improvements

(8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?

- Providing more different OS images as standard
- Getting the Fed4FIRE automated account creation working (minor)

Report from Virtual Wall

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
- Nothing special
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
- Inline with expectation

Technical work

- (3) How much effort did you spend on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
- Nothing special
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
- (5) How much effort did you spend on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
- through the fed4fire usergroup

Nature

- (7) Was the experiment a typical example you expected for your testbed and its capabilities?
- Yes

Improvements

- (8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?

HEMOSF

Report from BonFIRE

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
- 0.1 PM (2 days general support/interaction)
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
- In line with expectation.

Technical work

- (3) How much effort did you spend on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
- 0 days.
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
- N/A
- (5) How much effort did you spend on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.
- N/A

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
- Interaction through e-mails and the Forum.

Nature

- (7) Was the experiment a typical example you expected for your testbed and its capabilities?
- Yes.

Improvements

- (8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?
- No.

Report from Virtual Wall

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
- Nothing special
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
- Inline with expectation

Technical work

- (3) How much effort did you spend on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
- Nothing special
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
- (5) How much effort did you spend on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
- through the fed4fire usergroup

Nature

- (7) Was the experiment a typical example you expected for your testbed and its capabilities?
- Yes

Improvements

- (8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?

MEMO

Report from w-iLab.t

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
 - 0.5 PM (3 days general support/interaction, 7 days technical work on bug fixing& software, tutorial improvement)
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
 - In line with the expectation. The mobility framework that was used during the experiment was relatively new, so some bugs were expected to show up.

Technical work

- (3) How much effort did you spent on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment?
 - 2 days
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
 - The adaptations were mostly improvements to the mobility framework and are therefore permanently available to all experimenters.
- (5) How much effort did you spent on bug fixing of existing testbed functionality based on feedback from the experimenter?
 - 7 days (Rough estimate for fixing the bugs that were reported by the experimenter. Some other bugs might have been fixed due to the high usage of the mobility framework by this experimenter.)

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
 - 1 phone conf of 1 hour (2 persons)
 - Approx. 70 received e-mails (9 hours total), most of which were received through the google group `fed4fire-experimenters@googlegroups.com` . Some of the e-mails were handled privately because they did not apply to the whole experimenter community.

- As an outcome of this interaction we were able to improve the testbed documentation, the testbed reservation mechanism and in particular the w-iLab.t mobility framework. A new extensive mobility tutorial was written, partly based on input from this OC experiment.

Nature

- (7) Was the experiment a typical example you expected for your testbed and its capabilities?
- The experiment used the wireless nodes (WiFi), with custom OS images (openWRT), in combination with lots of mobile nodes. The experiment can be seen as a typical experiment for the testbed and its capabilities. No extra hardware/software had to be installed/developed to support this experiment, with the exception of bug fixes or software improvements.

Improvements

- (8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?
- Since the experiment used a new feature of the testbed, the mobility framework, there were quite some bugs that arose during the experiment. Therefore, the number of e-mails was relatively high. We believe that the improved software in combination with good tutorials will significantly reduce the number of e-mails. The Fed4FIRE google group should also help future experimenters, since some issues might already have been encountered by previous experimenters.

Mobile Train

Report from FuSeCo

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
- 0,6 PM in total (5 days of general support, 10 days of technical work, 3 days of preparation, documentation evaluation, etc.)
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
- slightly more (see (8)).

Technical work

- (3) How much effort did you spend on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
- 15 days that included 5 days of preparation and 10 days of development.
 - Preparation: i/. kick-off conf call; ii/. Installation of MTE-Client and measurement server; iii/. Configuration NTP and PTP, iv/. Configuration FW and port-forwarding v/. Enhancing documentation
 - Development: The OpenEPC developers team spent around 10 person days over 2 months of experiment work.
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
- we received 11 support requests from the experiment. Two of them were invalid (they complained about UDP connection and PTP issue, that we could not reproduce). Other 8 support requests were related to missing radio interfaces or malfunctioning MobilityManager.
 - One issue was that pktgen does not support ppp interface. Workaround was to use new ordered HUAWEI modem.
- (5) How much effort did you spend on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.
- The development work described in (3) can be partially attributed to bug fixing, however it is hard to estimate quantitatively (each innovative experiment is unique in its operational requirements)

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
- Interaction was via a kick-off conference call (gotomeeting in May 2014) and for the preparation mainly over private e-mails between Naudit (3 persons) and FUSECO (3-6 persons, since besides the FUSECO deployment certain technical details – such as activation/deactivation of access points - had to be clarified/confirmed with the OpenEPC

developers team) teams, it was structured along the preparation logic of the experiment (requirements analysis, compliance check, section D modifications, feasibility study, experiment architecture and set-up, addressing reviewers# comments, debugging, etc.).

- There was also an attempt to use the Fed4FIRE groupware (wiki) to enhance the collaboration however it had limited usage (due to access control issues)

Nature

(7) Was the experiment a typical example you expected for your testbed and its capabilities?

- The experiment was rather typical in almost all aspects but rigorous precision of measurements (finally solved, see below) and the usage of OpenEPC controls (see above).

Improvements

(8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?

- Clearly the required support from the OpenEPC development team was an overhead, which in future could be reduced by the concurrent deployment of several versions of FUSECO (not only the latest) software so that the one with least required capabilities could be used. This however is questionable in FOKUS because we are R&D and not a production company.

Report from PerformLTE

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
- 1.6 PM (9 days general support/interaction, 5 days preparing tutorial, 22 days setup the experiment)
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
- It was more than expected for two reasons. It was our first completely external experiment (PerformLTE was three months old by then) and the requirement of a good source of synchronism took us more than expected.

Technical work

- (3) How much effort did you spend on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
- Approximately 25 five days, it took a long time to prepare the setup requirement by the experiment, we installed a stratum 2 PTP server. We wrote a dedicated tutorial because our federation was not mature enough by then. We have to test several LTE dongles in order to provide one with a driver compatible with the one used by the experiment.
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
- Yes the PTP server is available after the experiment and we modify one of our applications in order to have a more controlled access and it will also be used.
- (5) How much effort did you spend on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.
- 5 days, due to several errors in the PTP server and the way the clients was synchronized to them.

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions: were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?
- We use phone calls, mail and skype. The tutorials were useful for that particular experiment because our federation tools were not ready yet but currently it has no use as we are almost federated.

Nature

- (7) Was the experiment a typical example you expected for your testbed and its capabilities?
- Not completely, due to time constraints we couldn't test our approach to LTE experiments (emulated environment, proprietary environment and at last live networks). The experiment was limited to the emulated environment; anyway we expect to have future collaborations with our experiment.

Improvements

- (8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?
- The technical work will be the same. We are now improving our federation and we expect to have to dedicate less time to tutorials as there will be more material freely available. In our particular case developing a small overview of LTE and our available configuration parameters will be possible for most of the experimenters (that normally come from a different discipline). When the whole Fed4FIRE portal becomes available, we can save time for general tutorials on Fed4FIRE tools and technologies.

RimeCode

Report from Netmode

General effort

- (1) How much effort (in number of person months) have you spent, in total, on providing support for the experimenter (both technical work and interaction)?
- Approximately 6 days were spent for providing support and interaction (to familiarize the experimenter with the NETMODE testbed and along with providing information between a set of other testbeds requested) and another 33 days for technical support (instructions on designing, setting up and executing the experiment, creating images etc). So in total we spent approximately 2 PM
- (2) Is the total spent effort more or less than anticipated or is it in line with your expectations?
- The total effort spent was in line with our expectation.

Technical work

- (3) How much effort did you spent on technical work to support the experiment, including help to use your infrastructure and tools, help in performing the actual experiment (design, execution and / or interpretation of the results) and adaptation of your standard testbed setup specifically for the experiment? Provide an explanation of the effort where possible.
- Experimenters requested approximately weekly support to familiarize with the testbed tools (e.g. OMF, OEDL etc). Moreover tutorials were requested and enhanced in order to provide technical support in setting up the experiment (e.g. customizing the baseline OS image) along with information about the topological characteristics of the NETMODE testbed (e.g. connectivity of the nodes, location of the nodes, hardware capabilities etc). Further assistant was provided in order to install appropriate measurement tools to facilitate the experimenter to collect and interpret the results.
- (4) Are any of the novel adaptations (mentioned in question (3) or other) permanently made available after the experiment?
- The adaptations are limited to tutorial enhancements.
- (5) How much effort did you spent on bug fixing of existing testbed functionality based on feedback from the experimenter? Provide an explanation of the effort where possible.
- Experimenters didn't report any bugs or malfunction in the operation of the testbed during the execution of the experiment. The technical work was limited in the technical support provided to the experimenter.

Interaction

- (6) Describe the interaction with the experimenter. How did the interaction take place (via private e-mail, via the Fed4FIRE forum, via phone calls)? What was the actual effort spent on communication (number and duration of interactions)? What was the outcome of your interactions:

were you able to refer to documentation and tutorials? Did you extend documentation and tutorials as a result?

- A weekly call approximately for 1h was made to solve any technical inquiry imposed from the experimenter. Approximately 70 mails were exchanged regarding technical support both in NETMODE and the rest of the Fed4FIRE facilities requested from the experimenters. Furthermore, experimenters visited the NETMODE facility in the NTUA University to have a visual perception of the testbed topology, the location of the nodes and the wireless environment.
- Documentation and tutorials were proved to be very helpful for the experimenters. We identified gaps in the NETMODE documentation and currently we are working towards updating it.

Nature

(7) Was the experiment a typical example you expected for your testbed and its capabilities?

- The experiment was an expected example of using a wireless testbed such as NETMODE and its capabilities. The experimenters requested a number of wireless 802.11 b/g nodes in different parts of the testbed (outdoor and indoor nodes) exploiting different wireless conditions, for the operation a wireless Content Delivery Network. Some additions to the baseline OS images were included to allow the communication of the NETMODE nodes with PlanetLab nodes (e.g., OpenVPN).

Improvements

(8) How can the effort on any of the abovementioned support topics be reduced (in general, on technical work, on interactions with the experimenter, etc.)?

- Most of the effort involved during the support of the experiment was expected, especially for experimenters that are not familiar with the conduction of experiments in the Fed4FIRE facilities. Extensive documentation and tutorials can definitely reduce the effort while the creation of a baseline image incorporating additional software packages (.e.g. including measurement tools) can further reduce technical support on designing, setting up and executing the experiment.